To: "Dr. Randall Ross" [Ross.Randall@epamail.epa.gov]; Steven Acree" [Acree.Steven@epamail.epa.gov]
From: CN=David Jewett/OU=ADA/O=USEPA/C=US
Sent: Wed 11/28/2012 5:17:16 PM
Subject: Fw: here's reference to that EPA Handbook I mentioned on the call
Hotspot
1 Comment
Encana
EPA
Hydraulic fracturing
Pavillion
shale
USGS
Water
Wyoming
Hotspot
the findings
Handbook of Suggested Practices for the Design and Installation of Ground-Water Monitoring Wells
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Below is an email from Dayna Gibbons. It has the EID article and URL. Dayna has highlighted passages of the article, including the guidance document reference.

- dgj -

Sent by EPA Wireless E-Mail Services

----- Original Message -----
From: Dayna Gibbons
Sent: 11/26/2012 04:40 PM EST
Cc: Alice Gilliland; Ayn Schmit; Cynthia Sonich-Mullin; David Jewett; Gary Foley; Jennifer Orme-Zavaleta; Jose Zambrana; Linda Sheldon
Subject: here's reference to that EPA Handbook I mentioned on the call
http://www.energyindepth.org/enormous-differences-between-epas-pavillion-data-and-usgss/

UPDATE Enormous Differences between USGS and EPA on Pavillion
Tuesday, October 16th, 2012 | 1 Comment | Tagged in: Encana, EPA, Hydraulic fracturing, Pavillion, shale, USGS, Water, Wyoming
15 13 5 2
Simon

Research Director

UPDATE I (12:38 p.m. ET) – The EPA was back in damage-control mode last week after a public hearing on the Pavillion case brought to light some truly embarrassing mistakes by the agency. Going into the Oct. 10 meeting in Riverton, Wyoming, it was already known that the EPA had ignored expert advice and technical standards from other federal agencies – the U.S. Geological Survey and the U.S. Bureau of Land Management – and the State of Wyoming. But during last week's meeting of the Pavillion Working Group, it was revealed EPA officials had also breached the agency's own rules for drilling groundwater monitoring wells. How do we know this? In part, because officials with the Wyoming Department of Environmental Quality actually took a video camera and lowered it into one of the EPA's monitoring wells to see what's been going on.

According to the findings of DEQ's "down-hole camera" investigation, the EPA falsely claimed to have used stainless steel casing for one of the two monitoring wells, MW02, when it released its December 2011 draft Pavillion report. In fact, the casing was made of carbon steel. Why is this a problem for a monitoring well that was built to detect the presence of chemicals in groundwater? Let's consult the EPA's "Handbook of Suggested Practices for the Design and Installation of Ground-Water Monitoring Wells":

"The presence of corrosion products represents a high potential for the alteration of ground-water sample chemical quality. The surfaces on which corrosion occurs also present potential sites for a variety of chemical reactions and adsorption. These surface interactions can cause significant changes in dissolved metal or organic compounds in ground water samples …

On the basis of these observations, the use of carbon steel, low-carbon steel and galvanized steel in monitoring well construction is not considered prudent in most natural geochemical environments. Conversely, stainless steel performs well in most corrosive environments, particularly under oxidizing conditions." p. 79

So, were any "corrosion products" found inside MW02? Yes, according to the Wyoming DEQ's findings:

"Mineral accumulation within the well indicates the well casing was not constructed of stainless steel as originally reported by EPA. This has been confirmed by EPA." p. 20

From there, the EPA's mistakes just keep piling up. The EPA said in December that MW02 was drilled to a depth of 980 feet, and below the bottom of the well were 17 feet of cuttings and leftover drilling mud. But DEQ's investigation found the well is actually 989 feet deep. Why is that a problem? Because there's a special screened section at the bottom of the well, where water samples are taken, and it now appears to be covered with drilling mud and cuttings. For water to seep into the bottom of the well, it must first move through the drilling mud and cuttings, and the water picks up some contaminants along the way. Once again, according to the EPA's monitoring-well handbook:

"Monitoring well installation procedures can also have a significant impact on the integrity of ground-water samples. For example, Brobst and Buszka (1986) found that organic drilling fluids and bentonite drilling muds used in mud rotary drilling can have an effect on the chemical oxygen demand of ground water adjacent to the wellbore in a rotary-drilled well. This, in turn, can affect the quality of a water sample taken from such a well, resulting in the acquisition of non-representative ground-water samples." p. 7

"…drilling fluid tends to infiltrate permeable zones and tends to interact chemically with the formation fluids. This is why the mud must be removed during the development process. This chemical interaction can interfere with the specific function of a monitoring well and prevent collection of a sample that is representative of the in-situ ground-water quality." p. 41

All the drilling mud and cuttings at the bottom of the well can lead to blockages in the screened section of the well, reducing the flow of water. In fact, when USGS officials went to Pavillion to check EPA's work, they refused to take groundwater-quality samples from MW02 because of the low flow rate. This photo from DEQ's down-hole camera investigation actually shows clogging of MW02's screened section:

DEQ geologist Nicole Twing, who presented the findings of the down-hole camera investigation at last week's hearing, explained the importance of MW02's flow rate in an interview with EID:

"You have low flow rates that increase the time water is in contact with those drilling materials, and materials used in drilling mud can affect groundwater quality. You don't know if it's biasing the results up or down."

So, in everyday terms, the water at the bottom of MW02 appears to be both stagnant and contaminated by the very materials that EPA used to build the monitoring well. That means any water samples taken from the well would not be representative of the water outside the well, which isn't stagnant and hasn't been contaminated by EPA's drilling materials.

In case you're curious what those materials might look like, DEQ also had cameras at the surface when some of that stuff was collected from the well:

But don't think the problems discussed at last week's hearing were limited to MW02. We're told USGS officials caused their EPA counterparts some heartburn by pointing out the potential for contamination from drilling materials in MW01. It's evident from this USGS graph, which shows pH levels falling as water was pumped out of MW01, allowing fresh groundwater to seep into the well

and collect at the bottom:

The trend in this graph shows something that the EPA will have a tough time explaining when its draft Pavillion report finally goes into peer-review. It shows that the chemical properties of the fresh water outside MW01 are different than the chemical properties of the water collected inside MW01. Or, put another way, something about the monitoring well itself may be contaminating the fresh water as it seeps into the well.

So, when confronted with all this criticism about MW01 and MW02 – the agency's only two monitoring wells in Pavillion – how did EPA respond? By releasing more test results from both wells, pushing back the peer review process by another three months, and repeating its claim that the EPA's data is "generally consistent" with data from USGS.

Based on a preliminary examination of the latest EPA data, the EID team would like to close with a couple of observations about the "generally consistent" statement. First, when the EPA has a two-well monitoring program, and experts from the USGS refuse to take samples from one of those wells because it can't produce a reliable sample, you are left with a one-well monitoring program.That's not generally consistent. Second, when the EPA releases a new batch of test results, and finds chemicals that the USGS did not even detect – such as acetone, isopropanol, and formate – that's not generally consistent, either.

But, when you think about it, attention to detail probably isn't all that important to EPA officials who disregard their own guidelines for drilling monitoring wells when they go out and drill monitoring wells.

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